

PEOPLE ISSUES

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Good morning ...

I want to discuss with you this morning the subject of people; how they are affected by the system as well as their influences upon the system.

Today's airplanes are subject to very few critical failure modes. We have nearly eliminated the mechanical causes for accidents. This is traceable to the design requirements of the relevant governmental regulations as well as the specifications of operating organizations and the design skills of manufacturers. We have come a long way in the last 80 years.

But, we are now faced with what I believe is rapidly becoming the dominant element in aviation safety. I am referring to people.

They are affected:

- by man/machine interfaces which influence mechanic, controller and pilot induced errors.
- by relationships between designer and maintenance users.
- by relationships between and among regulators and regulated, and;
- by individual responsibility and accountability

During the past two years in the civil arena we have had an unprecedented number of accidents in which the overwhelming causes appear to be people centered. Consider some recent examples of problems in the cockpit, the tower and in the hanger.

In November, 1995 an MD-80 was nearly lost in East Granby, Connecticut. Barely two months later, a DC-9 was nearly lost in Houston Texas. Fortunately there were no serious injuries in either incident; just substantial damage to the aircraft. The principle causative agents in both these incidents are similar - people, procedures and communications.

I am further alarmed at what I believe is a trend for air traffic control induced pilot error. I refer to controllers who issue unreasonable, unwise or uninformed instructions. These instructions involve maneuvering aircraft in ways that simply should not be undertaken.

This is exemplified by a recent ATR 72 accident in Roselawn Indiana; and an Embraer 120 in Monroe Michigan. The common denominator in both these

accidents was that the airplanes were operating in icing conditions for an extended period at slow speeds. The pilots of these aircraft were following instructions from ATC. However, ATC was not aware that their clearances put the airplanes at risk and the pilots did not inform the controllers they were in icing. Again - people, procedures and communications.

Between 1961 and mid 1995 there were over 32 accidents related to maintenance error; approximately one per year. Yet, from mid 1995 until the summer of 1996 we had 5 accidents directly related to maintenance error. Something is definitely wrong. I suspect - people, procedures communications and design.

Finally, in 1994 a structural survey of retired transport aircraft was done. This involved an assessment of the adequacy of structural repairs accomplished upon them during their working lives. The results were alarming. Both engineering and the quality of accomplishment of the repairs was disturbingly inadequate. Again - people, procedures, communications and design appear to be underlying culprits.

The common denominator among all these accidents is that the human in the loop fails for a variety of reasons. We have more than 40 years of human factors research into the flight deck, a little less than ten in maintenance and next to none in the engineering design arena. It's obvious that we have a way to go before we understand the human factors issues. People related accidents continue to occur.

The elements to solving much of the people problem are simple.

Control the information explosion which plagues the cockpit and the hanger when digital airplanes are involved. Aggressively apply existing, proven human factors techniques to both; but particularly to the long neglected maintenance and design disciplines.

Bring controllers into the pilot training process so that both develop a better understanding of each others operating environments.

Design for maintenance.

Maintainability is not just ergonomics or accessibility. It includes the management of failure to keep the airplane available while concurrently keeping it airworthy. Engineering needs to be closer to maintenance, both at the manufacturer and the airline to accomplish this end. Designers and maintainers must communicate.

This is radical thinking. It is amazing what involvement the user of the product with the designer of the product will yield. Original designs become more appropriately directed toward;

- reducing change error and rework
- reducing maintenance related error
- improving equipment reliability and hence its' availability to the schedule and;
- reducing maintenance costs.

This means maintenance must be at the design table as an equal to the demands of drag, weight and producability. But in turn maintainers must concern themselves with the limitations imposed upon designers.

Engineering designers must spend time at the maintenance table. Young engineers, as a part of their training, should be exposed to the problems and concerns of the entire maintenance community including maintenance engineering, line and hanger maintenance, planning and task performance. This includes a healthy infusion of practicality to temper academic correctness.

The relationships between government and industry clearly affect people. We are all a part of one global aviation family.

Design, operating and regulatory issues **must** be debated. But, put principles before personalities. Let the debate be among peers not adversaries. We must stop bickering and sniping at each other - industry, operators and regulators. I agree heartily with the principles of working together.

Finally people have their own effect upon safety.

Aviation has long held responsibility and accountability to be core values. It is an industry built upon trust. Each of us expects, in fact, demands, that every discipline do his/her job. This embraces responsibility and accountability.

However, something has happened within our operating organizations. I think one such "something" is a clear change in the employee makeup of this industry.

Employees hired since the mid 80's - one major airline calls it the "Class of 1986," appear to come into the industry without a dedication to aviation.

They only accept employment because it's a job with better benefits than many others. Thus we see today, people who accomplish their work blindly without thinking of the consequences of their actions, or who do not challenge the system if they believe it is wrong. They are part of a culture in which few, if any, feel accountable for their actions, except for the bottom line or personal agendas. The consequences are disturbing.

For example.

Some of you may believe that an FAR Part 145 repair station certificate is an automatic index of quality and expertise. This is not always the case.

This became painfully clear after the Everglades accident. We found that up to 70% of the employees at the repair station associated with the accident were not certified technicians. Many had minimal training. Under these circumstances an extremely good quality surveillance system would be assumed to be in place. But it wasn't.

This had a serious negative effect upon the work product and safety.

It is the true people problem.

We need, many believe, a return to a culture of individual responsibility and accountability for behavior within our system if we hope to ever get a handle on all our safety problems.

In conclusion, safety involves people --- their procedures communication, designs and dedication. I believe the solutions are simple. **It is nothing more than a reestablishment of cooperation and individual responsibility.**

Thank you...